

CLAIMS

I claim:

1. A locomotive relay assembly comprising:

a plurality of solid-state relay devices, each of said solid state relay devices having a switch, and a signal regulated by a D.C./D.C. power converter;

wherein each said switch comprises a solid-state relay load side, and each said signal comprises a solid-state relay control side opposite said solid-state relay load side.

2. The locomotive relay assembly according to claim 1, wherein said D.C./D.C. power converter regulates standard locomotive voltage by stepping down said locomotive voltage to a solid-state relay control side voltage.

3. The locomotive relay assembly according to claim 2, wherein said solid-state relay load side, in the presence of said standard locomotive voltage, has a combined normally open switch configuration and a normally closed switch configuration, said normally closed switch configuration comprising an internally self-biased solid-state relay device and an externally self-biased solid-state relay device, wherein said externally self-biased solid-state relay device is self-

biased due to electricity running from said load side to said control side through a first D.C./D.C. power converter that runs in parallel with said externally self-biased solid-state relay device.

4. The locomotive relay assembly according to claim 3, wherein said solid-state relay control side, in the presence of the electricity passing through a second D.C./D.C. power converter at said standard locomotive voltage, causes said normally open configuration to close, and causes said normally closed configuration to open, wherein the opening of said internally self-biased solid-state relay device causes said externally self-biased solid-state relay device to be no longer self-biased, thus opening said externally self-biased solid-state relay device.

5. The locomotive relay assembly according to claim 4, wherein said solid-state relay load side consists of said normally open configuration only, said locomotive relay assembly further comprising:

an A.C. solid-state relay device operating at standard locomotive A.C. voltage, said A.C. solid-state relay device comprising a solid-state relay load side and a solid-state relay control side regulated by said second D.C./D.C. power converter;

wherein said solid-state relay control side, in the presence of electricity passing through said second D.C./D.C. power converter at said standard locomotive voltage, causes said normally open configuration and said A.C. solid-state relay device to close.

6. A method of replacing a mechanical-style locomotive relay with a solid-state relay assembly, said mechanical-style locomotive relay having a control side and a load side, said method comprising the steps:

- (a) preparing a locomotive for servicing;
- (b) opening the battery knife switch;
- (c) locating the relay to be replaced;
- (d) marking all unmarked wires that are connected to either a relay coil on the control side or to a relay interlock on the load side of the mechanical-style locomotive relay;
- (e) removing said wires from existing mechanical-style locomotive relay;
- (f) removing screws and discarding the mechanical-style locomotive relay;
- (g) aligning solid-state relay assembly mounting holes with original mechanical-style locomotive relay mounting holes and attaching the solid-state relay assembly into place onto an electrical cabinet such that it is directly connected to wiring carrying standard locomotive voltage;
- (h) inspecting said wires and terminals for serviceability;
- (i) returning said wires to the solid state relay assembly at the same location as on the old relay; and
- (j) closing the battery knife switch.

7. A method of installing, as part of an original locomotive manufacture, a solid-state relay assembly into the electrical cabinets of a locomotive, said method comprising the steps:

(a) preparing the locomotive's electrical cabinet for installation of the solid-state relay assembly;

(b) installing the solid-state relay assembly into the electrical cabinet such that it is directly connected to wiring carrying standard locomotive voltage; and

(c) proceeding with wiring.